

REMARKS

Upon entry of the amendments, claims 1-31 and 37-39 will be pending. Claims 1 and 18 have been amended to more clearly provide antecedent basis for claim terms. As the amendments merely correct an alleged informality, entry of the amendments is respectfully requested. No new matter has been added.

Specification

The specification is objected to as failing to provide proper antecedent basis for “a handle to adjust each orientation of the cutting shape” as recited in claim 18. Claim 1 is rejected for lacking antecedent basis for the language “closed cutting surface” and “volume greater than the volume of the crown of the tooth.” Claims 1 and 18 have been amended to address the alleged informalities. Accordingly, removal of the objection to the specification is respectfully requested.

Rejections Under 35 USC 112

Claims 1-39 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. It is alleged that no support found for the claimed language “closed cutting surfaces” as in at least claims 1, 21, 22, 23, 24, 26, 37, 38, and 39. It is further alleged that no support found the limitation “the crown portion of the closed cutting surface comprises a volume greater than the volume of the crown of the tooth.”

Applicants initially point out that there are no pending claims 32-36. Claims 32-36 had been canceled prior to the current response.

Applicants respectfully disagree with the rejections, and submit that the claims are clearly supported throughout the specification and figures as originally filed. Attention is respectfully drawn to paragraph 0011 of the published application, reciting that “[t]he method can include defining an enclosing surface to enclose the crown of the tooth.” Attention is further drawn to 0065 and 0068 of the published application, further describing a closed cutting surface as claimed. Attention is further directed to Figures 6 (e.g., cutter 302) and 12 (e.g., cutter 500),

and corresponding text in the originally filed specification, all of which clearly provides written description support for the currently claimed invention.

A similarly reasoned rejection has been applied to claim 18 for “a handle to adjust each orientation of the cutting shape.” It is alleged that the identified claim language lacks written description support in the originally filed application. Applicants initially point out that, prior to the currently presented amendment to clarify the antecedent basis in claim 18, this claim represented an originally filed claim. As originally filed claims are considered part of the specification, and provide their own written description support, it is unclear why the Examiner believes this claim to be lacking proper written description in the originally filed application. Attention is further directed, e.g., to Figure 12 and paragraph 0085 of the published application, where user positioning/orientation of cutter 500 using axis widget 502 is described, further providing written description support.

Accordingly, for at least the reasons set forth above, it is respectfully requested that the rejections of claims 1-39 under 35 USC 112, first paragraph be withdrawn.

Claims 1 -39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is allegedly not clear what is meant by “closed cutting surfaces.” It is stated in the Office action that, according to figure 6, it appears that the cutting surface 304 (e.g. rim or gingival curve) is not a closed surface. Applicants respectfully disagree. Referring to Figure 6, for example, a three dimensional closed cutting surface is described (e.g., cutter 302), with the cutting surface passing through a line between the gingival and a crown of the tooth (see, e.g., rim/gingival curve 304). The skilled artisan viewing the specification would clearly appreciate the metes and bounds of the currently claimed invention.

Furthermore, the Office action alleges it is not clear what is meant by “the crown portion of the closed cutting surface comprises a volume greater than the volume of the crown of the tooth.” Again, reference may be made to Figure 6, for example, where one skilled in the art

would recognize that the cutter 302 has a crown portion that is larger in volume compared to the crown of tooth 301. There would be no lack of clarity of the currently claimed invention in light of the originally filed specification.

Accordingly, withdrawal of the rejections of claims 1 -39 under 35 U.S.C. 112, second paragraph, is respectfully requested.

Rejections Under 35 USC 103

Claims 1-4, 6-7, 10-12, 14-17, 21-22, 24-28, 30-31, 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sachdeva *et al.* (6,250,918, hereafter Sachdeva) in view of Liang *et al.* (6,606,091, hereafter Liang).

For at least the reasons set forth below, Applicants respectfully submit that the cited references fail to teach or reasonably suggest the currently claimed invention, thereby precluding a case of *prima facie* obviousness.

Sachdeva discloses a method and apparatus for simulating tooth movement for an orthodontic patient. The currently claimed invention, e.g., as recited in claim 1, is directed to a computer-implemented method for separating gingiva from a tooth on a computer model of the gingival and the tooth. While Sachdeva illustrates teeth, the reference does not teach separating virtual gingival from a virtual tooth in a computer model of the teeth (e.g., as admitted at page 4 of the Office action). Other than illustrating a digital model of a tooth, it is unclear what, if anything, Sachdeva adds to the record to support the allegation that the claimed method for separating gingival from a tooth can be found in the prior art.

Liang discloses a system for interactive 3D object extraction from 2D slice-based medical images. While the abstract of Liang mentions masking out of the undesirable parts of a data set, Liang fails to teach separating gingival from a tooth on a computer model of the gingival and the tooth, and certainly fails to teach the separation methods specifically recited, e.g., in current claim 1. For example, nowhere does Liang teach or reasonably suggest a method including defining a three dimensional closed cutting surface passing through a line between the gingiva and a crown of the tooth, the crown defining a volume, wherein the closed cutting surface comprises a crown portion surrounding the crown of the tooth and a root portion

approximating the shape of the root of the tooth, and wherein the crown portion of the closed cutting surface comprises a volume greater than the volume of the crown of the tooth; and applying the cutting surface to the tooth to separate the gingiva from the tooth, as recited in claim 1.

It is insufficient for establishing *prima facie* obviousness to merely point out that the Liang reference discloses some method separating or masking out parts of a data set, while ignoring clear differences between the currently claimed method and the techniques of Liang. The cited references of Sachdeva and Liang, taken alone or in combination, simply fail to teach or reasonably suggest the currently claimed invention, e.g., as recited in claim 1. As such, a *prima facie* case of obviousness cannot be found.

Accordingly, withdrawal of the rejections of claims 1-4, 6-7, 10-12, 14-17, 21-22, 24-28, 30-31, 37-39 under 35 U.S.C. 103(a) is respectfully requested.

Claims 4-5, 8-9, 13, 23, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sachdeva in view of Liang as applied to claim 1 above, and further in view of Andreiko *et al.* (5,431,562, hereafter Andreiko).

The combination of Sachdeva and Liang as applied to claim 1 is traversed for at least the reasons set forth above. Andreiko is cited as teaching a spline and parabolic function for a curve. Andreiko, however, fails to provide the teachings that are missing from Sachdeva and Liang. As such, the cited references, alone or in combination, fail to teach the invention as recited in claim 1 or 23. Claims 4-5, 8-9, 13, 29 will be allowable at least for depending from allowable independent claim 1.

Accordingly, withdrawal of the rejections of claims 4-5, 8-9, 13, 23, 29 under 35 U.S.C. 103(a) is respectfully requested.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sachdeva *et al.* in view of Liang as applied to claim 1 above, and further in view of Ernst (6,402,707, hereafter Ernst).

The combination of Sachdeva and Liang as applied to claim 1 is traversed for at least the reasons set forth above. Ersnt is cited as teaching a cylindrical coordinate system. Ernst, however, fails to provide the teachings that are missing from Sachdeva and Liang. As such, the cited references, alone or in combination, fail to teach the invention as recited in claim 1. Claims 4-5, 8-9, 13, 29 will be allowable at least for depending from allowable independent claim 1.

Accordingly, withdrawal of the rejection of claim 17 under 35 U.S.C. 103(a) is respectfully requested.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance and an action to that end is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 206-467-9600.

Respectfully submitted,

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By: _____

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